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(19) (CA) **CANADIAN PATENT** (12)

(54) SHIELD PLATE IN WHEEL AND DISC BRAKE ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

5 A shield plate is clamped between the spider of an automotive vehicle wheel and the rotor of a disc brake for that wheel. This plate covers the axially inboard side of the wheel spider and prevents dust given off by the disc brake from getting on the wheel at the axially outboard side of the wheel spider, where it would be visible and detract from the vehicle's appearance.

SHIELD PLATE IN WHEEL AND  
DISC BRAKE ASSEMBLY

5 One of the problems with disc brakes on cars, particularly certain foreign cars, is that during braking a substantial amount of dust is given off by the brakes and ends up on the axially outboard side of the wheels, leaving a coating which de-  
10 tracts from the car's appearance.

The present invention is directed to a wheel and disc brake assembly which incorporates in a novel manner a shield plate which prevents dust given off by the brake from reaching the visible side of the wheel.

15 In accordance with a presently-preferred embodiment of the invention, a generally flat shield plate is sandwiched between the brake rotor and the spider of the wheel at the axially inboard side of the spider. This shield plate is spaced axially outward from the brake disc, and it covers the inside of the wheel at the  
20 inboard side of the wheel spider so as to prevent dust given off by the braking from reaching the wheel on the outboard side of the wheel spider.

25 A principal object of this invention is to provide an improved vehicle wheel and disc brake assembly having a novel shield arrangement for preventing dust produced by the brake from being deposited on a visible portion of the wheel.

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In one aspect of the invention there is provided  
a vehicle wheel having an annular tire support and  
a spider extending inward from the rim transverse to the axis of  
the wheel, said spider having a plurality of openings therein  
5 spaced inward from the rim,

and a disc brake having a caliper with a brake pad,  
and a brake rotor clamped to the wheel spider and carrying a  
brake disc spaced axially inboard from the wheel spider and  
facing the spider,

10 said brake disc producing braking dust at the side  
thereof facing said spider due to friction generated between  
said brake pad and said brake disc when the brakes are applied,  
the improvement which comprises a shield plate clamped between  
the wheel spider and the brake caliper and the brake rotor  
15 axially outboard from the brake caliper and the brake disc, said  
shield plate blocking the axially inboard side of the wheel  
spider from the brake caliper to prevent the escape of friction  
generated braking dust from the brakes through the wheel spider  
onto the wheel at the axially outboard side of the wheel spider.

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Further objects and advantages of this invention will be apparent from the following detailed description of two presently-preferred embodiments thereof, which are shown in the accompanying drawing.

#### DESCRIPTION OF THE DRAWING

Figure 1 is a perspective view of a shield plate in accordance with the present invention;

Figure 2 is an outer end view of a wheel and disc brake assembly incorporating the present shield plate;

Figure 3 is a longitudinal section through this assembly taken along the line 3--3 in Figure 2; and

Figure 4 is a fragmentary longitudinal section showing a modified arrangement of the wheel, disc brake and shield plate assembly of this invention.

Before explaining in detail the illustrated embodiments of the invention, it is to be understood that the invention is not limited to the details of the particular arrangements shown but is capable of other embodiments. Also, the terminology used herein is for the purpose of description and not of limitation.

#### DETAILED DESCRIPTION

Referring to Figure 3, the present assembly includes a car wheel and a disc brake of conventional design. The right side is the axially outboard, visible side of the wheel in Figure 3. The wheel has an annular rim 10 which carries an inflatable tire (not shown) and a spider 11 rigidly attached to the inside of the rim and extending transversely inward from it is a generally

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radial direction. The wheel spider has a central opening 12 which extends in spaced relation around the hub 13 of the brake rotor 14. The wheel spider also is formed with a plurality of circumferentially spaced, arcuate openings 11a (Figure 2) for design and strength purposes.

At the axially outboard (right) side of the wheel spider 11 in Figure 3 the brake rotor carries a cap 15 which covers the end of the stub shaft (not shown) of the steering knuckle on which the brake rotor is rotatably mounted by anti-friction bearings. At the axially inboard (left) side of the wheel spider 11 in Figure 3 the brake rotor 14 presents a cylindrical side wall 16 of substantially larger diameter than the central opening 12 in the spider 11 of the wheel. This cylindrical side wall 16 is joined integrally to the hub 13 of the brake rotor by a flat, annular, transverse wall 17 extending radially between them.

A plurality of circumferentially spaced, screw-threaded wheel studs 18 extend axially outward from the transverse wall 17 of the brake rotor. These studs pass loosely through corresponding openings 19 in the wheel spider 11. Nuts 20 are threaded onto the wheel studs 18 to clamp the brake rotor 14 to the wheel.

A brake disc 21 is affixed to a slightly enlarged segment 22 of the brake rotor 14 at the axially inboard end of its cylindrical side wall 16. A disc brake caliper 23 carries frictional wear pads for engagement with the brake disc 21 in a known manner. The brake caliper is suitably mounted on the vehicle so as to remain stationary while the wheel 10, 11, the

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brake rotor 14 and brake disc 21 rotate in unison.

In accordance with the present invention, an annular shield plate 24 as shown in Figure 1 is clamped between the wheel spider 11 and the transverse wall 17 of the brake rotor. In the embodiment shown in Figure 1 the shield plate is thin and flat. This shield plate has a circular outer periphery 25 which, as shown in Figure 3, has a slight clearance from the inside of the cylindrical outer periphery 11b of the wheel spider 11 where the latter is joined to the wheel rim 10. The shield plate 24 is formed with a plurality of openings 26 which register with the openings 19 in the wheel spider 11 for passing the wheel studs 18 on the brake rotor. Also, the shield plate 24 has a circular central opening 27 which passes the hub 13 of the brake rotor.

As shown in Figure 3, the shield plate 24 extends completely across the axially inboard face of the wheel spider 11 where the latter would otherwise be exposed to dust produced by the disc brake when it is applied. The shield plate prevents such dust from escaping through the openings 11a in the wheel spider and lodging on the wheel at the axially outboard side of the wheel spider. There is only very slight clearance or no clearance between the outer edge 25 of this plate and the inside of the wheel so that virtually no dirt or water can escape axially outboard past the shield plate.

In the modified arrangement shown in Figure 4, plate 24 is formed with an axially offset bulge 24' to accommodate a brake caliper 23' which extends axially outboard beyond the transverse



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5 wall 17 of the brake rotor 17. Except for this change, the assembly is the same as in Figure 2, with the shield plate being of thin, flat configuration except at the bulge 24' and the other elements of the assembly being identical to the corresponding elements in Figure 3.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In combination with:

a vehicle wheel having an annular tire support and a spider extending inward from the rim transverse to the axis of the wheel, said spider having a plurality of openings therein spaced inward from the rim,

and a disc brake having a caliper with a brake pad, and a brake rotor clamped to the wheel spider and carrying a brake disc spaced axially inboard from the wheel spider and facing the spider,

said brake disc producing braking dust at the side thereof facing said spider due to friction generated between said brake pad and said brake disc when the brakes are applied, the improvement which comprises a shield plate clamped between the wheel spider and the brake caliper and the brake rotor axially outboard from the brake caliper and the brake disc, said shield plate blocking the axially inboard side of the wheel spider from the brake caliper to prevent the escape of friction generated braking dust from the brakes through the wheel spider onto the wheel at the axially outboard side of the wheel spider.

2. The combination of claim 1, wherein said shield plate extends completely across said brake caliper and brake disc and substantially completely across the wheel spider at the axially inboard side of the wheel spider and covers said openings in the wheel spider.

3. The combination of claim 2, wherein said shield plate has a circular peripheral edge with a slight clearance from the inside of the wheel.

4. The combination of claim 3, wherein:

said brake rotor presents a transverse wall at the axially inboard side of the wheel spider and wheel studs

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projecting axially outboard from said transverse wall;

said wheel spider presents additional openings which pass the wheel studs;

said shield plate is sandwiched between said transverse wall of the brake rotor and the axially inboard side of the wheel spider;

and said shield plate presents openings which register with said last-mentioned additional openings in the wheel spider for passing the wheel studs.

5. The combination of claim 4, wherein said shield plate is substantially flat throughout its extent.

6. The combination of claim 4, wherein:

said disc brake has a brake caliper which projects axially outboard beyond said transverse wall of the brake rotor;

and said shield plate is substantially flat throughout its extent except at the brake caliper and at the brake caliper presents a bulge which projects axially outboard from the remainder of the plate to accommodate the brake caliper.

